Remarks

This paper is in response to the Advisory Action dated October 18, 2006. Currently Claims 1-8; 9-16; and 17-24 remain in the case with none of the claims being allowed. Independent Claims 1 and 9 have been amended to more clearly reflect that the recited adjusting is for a time period. Support for these amendments is found in the claims as filed.

The Office maintains its position that Applicant's specification does not enable one of ordinary skill in the art to practice the present invention.

The Office argues that:

(1) The claimed invention is broad because the step of adjusting the reducing environment time period is broad;

(2) Applicant's statements that the state of the art is well developed and that individuals of ordinary skill in the art have advanced engineering degrees (e.g.,PhD or MS) are self serving and contradictory;

(3) Applicant's table 1 and table 2 only show results and do not enable; and

(4) Applicant's variables for adjusting the reducing environment time contain no specific parameters.

In response to the Office's point (1), Applicant agrees that there may be numerous ways to adjust the reducing environment. However, that is just one part of the claimed limitation. For example:

Claim 1 recites adjusting the reducing environment for a time period **such that SO_3 is reduced to SO_2 prior to selective catalytic reduction to achieve a desirable level of SO_3.**

Claim 9 recites adjusting the reducing environment for a time period **such that SO_3 is reduced to SO_2 to achieve a desirable level of SO_3; combusting the remainder of the fuel in an oxidizing environment; thereby reducing the conversion of levels of SO_3 in the flue gases.**

Claim 17 recites adjusting the reducing environment time period **such that SO_3 is preferentially reduced to SO_2 to achieve a desirable level of SO_3; combusting the remainder of the fuel and combustion intermediates in a second stage with oxidizing environment; thereby controlling the levels of SO_3 in the flue gases.**

Applicant believes these limitations, when considered in their entirety, are not broad. They are directed, inter alia, to changing a specific compound, SO_3, to another specific compound, SO_2, in a novel way, with a novel motivation.

Regarding the Office's point (2), Applicant disagrees with the Office's assertion that the state of the art and the level of ordinary skill in the art are inversely related or are mutually exclusive. Applicant believes, and believes that the Office would agree, that there are numerous arts which are well developed and where the level of ordinary skill is high.

For example, Applicant believes the Office would agree that the many of the medical arts are well developed. Applicant also believes that the Office would agree that the level of ordinary skill of the doctors (MDs) practicing those arts is high. For most of the complex arts (e.g., biological, chemical, and advanced engineering) this is the case. Respectfully, Applicant does not believe it is contradictory to have a complex art be well developed and still be practiced by highly skilled individuals; Applicant believes it is the norm.

Further, Applicant notes that if the two relationships were inversely related, or mutually exclusive, there would be no need for courts to consider them as individual factors, a determination of one would presuppose the other.

Regarding the Office's points (3) and (4), Applicant believes there is disclosure of parameters necessary to enable one of ordinary skill in the art to practice the present invention. Applicant discloses (page 8, lines 19-24):

> Surprisingly and importantly, with the present invention methods and systems, the net effect is that any SO3 that is formed during combustion is quickly reduced to SO2 in the first stage and SO3 is not reformed by oxidation to SO2 because there is not enough residence time at sufficiently high temperature in the furnace in the latter, fuel-lean stages. Thus, the present invention advantageously uses the differences in reaction rates to reduce and maintain the SO3 levels in the flue gas.

Page 12, lines 1-11 discusses one way to achieve the invention. The specification discloses that:

(1) An adequate reducing environment according to the present invention is one that will reduce SO_3 to SO_2 in less than about 2 seconds, more preferably, in less than about 0.5 seconds.

(2) A reducing environment can be achieved when the first stage flue gas temperature is greater than or equal to 900 Kelvin (1160 degrees F), more preferably greater than about 1255 K (1800 degrees F), even more preferably greater than about 1650 K (2500 degrees F).

(3) The ratio of the concentrations of reducing radicals to oxidizing radicals is greater than about 1; more specifically, the ratio of the concentrations of H radicals to O radicals is greater than about 1. A better reducing environment is one where the ratio of the concentrations of reducing radicals to oxidizing radicals is greater than about 10; more specifically, the ratio of the concentrations of H radicals to O radicals is greater than about 10.

Applicant also discloses that for furnaces with SCRs in operation, the acidity is preferably regulated to reduce total flue gas acidity (page 11, lines 2-3). Applicant discloses that if the SO_3 concentration is too high, the flue gas becomes highly acidic and creates a blue-plume and contributes to acid rain (page 3, lines 12-13). Applicant discloses that at about 8 to 10 ppm SO_3, a blue-plume is visible (page 3, lines 3-4).

Applicant discloses that for furnaces without SCRs or with by-passed SCRs, levels are adjusted to enhance ESP function, and that between about 10 and about 15 ppm SO_3 is ideal for ESP efficiency (page 11, lines 3-6).

Applicant believes that these parameters provide disclosure necessary for those of ordinary skill in the art to practice the present invention. Applicant also discloses other ways to practice the present invention.

Applicant discloses, "to increase the reduction of SO3, the residence time can be increased or the reducing potential in the flue gases can be increased" (page 9, lines 3-4). Several examples of each are provided (page 9, lines 5-17):

To increase residence time, several methods are available.

1) The distance between stages can be lengthened
2) The mixing can be increased for macro-staging applications
3) The mixing can be decreased for micro-staging applications
4) The mass flow between stages can be reduced (deeper staging)
5) The volumetric utilization between stages can be increased (e.g., swirl)
6) The pressure can be increased
7) The density can be increased

To increase the reducing potential in the flue gases, several methods are available.

1) The temperature can be increased
2) The stoichiometric ratio (i.e., the air-to-fuel ratio) can be decreased.
3) The local fuel flow can be increased (for fixed air flow)
4) The local air flow can be decreased (for fixed fuel flow)

Applicant believes these methods of adjustment, in light of the parameters disclosed above, are well within the level of one of ordinary skill in the art.

It is well settled that a patent applicant need not set forth all information necessary to practice the claimed invention. See, for example, MPEP §2164.05(a). Courts hold that information well known to persons of ordinary skill in the art need not be included in the specification, and is preferably omitted. *In re Buchner*, 929 F.2d 660, 18 USPQ2d 1331 (Fed. Cir. 1991).

These points are important in regard to the various methods of adjusting in the present invention. As stated in Applicant's specification, Applicant believes that the various techniques for adjusting are well known in the art because they are used and adjusted to achieve NOx emissions reduction (see, for example, page 5, lines 13-15 of the specification as filed). Applicant is using known techniques (e.g., various methods of adjusting) in new way to achieve new results.

In *Genentech, Inc. v. Novo Nordisk*, 42 USPQ2d 1001, 1002 (Fed. Cir. 1997), the patent claim was directed to a method of making hGH (a protein) using cleavable fusion expression. The specification did not describe a specific material to be cleaved or any conditions under which cleavable fusion expression would work. The Court held that "when there is no disclosure of any specific starting material or any of the conditions under which a process can be carried out, undue experimentation is required; there is a failure to meet the enablement requirement that cannot be rectified by asserting that all the disclosure related to the process is within the skill of the art". *Id.* at 1005.

In this case, a starting material, SO_3 produced by combustion, and numerous parameters, as discussed above, are disclosed. Additionally, the methods of adjusting can be determined relative to the above parameters and/or are well known in the art, for example, for NOx control. Applicant believes that for these reasons the present invention is enabled.

Claims 1-8 were also rejected for containing subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor had possession of the claimed invention at the time of filing. In particular, the Office argues that there is no written description for "*prior* to selective catalytic reduction". Applicant disagrees.

Applicant's specification discloses:

> [A]n SCR is often only intended to be used for six months per year (during the summer ozone control season), and are bypassed during the winter. This

creates seasonal variability in the SO_3 concentrations at the precipitator, in the duct work, and out of the exhaust stack.

It is therefore desirable to control the concentrations of SO_3 in the flue gas depending upon whether the SCR is in use or not.

(Page 3, lines 16 – 21). "Prior to selective catalytic reduction" refers to those burners using SCR. Applicant goes on to describe:

> For furnaces with SCRs in operation, the acidity is preferably regulated to reduce total flue gas acidity. For furnaces without SCRs or with by-passed SCRs, the SO_3 is preferably regulated such that the SO_3 levels going to the ESP enhance or favor precipitation. For current ESPs, SO_3 levels between about 10 to about 15 ppm (by volume) in the exhaust is desirable for best ESP efficiency.

(Page 11, lines 2 - 6). This section discloses what levels, prior to SCR, are preferable.

Applicant believes these disclosures address the Office's concerns regarding written description.

Again, Applicant respectfully requests that the Examiner withdraw the finality of the current Office Action and respond to Applicant's arguments regarding the 35 U.S.C. §102 and 35 U.S.C. §103 rejections of the previous Office Action.

Applicant submits that all claims are allowable for the reasons given above and that the case is in condition for allowance. Such action is respectfully requested. However, if any issue remains unresolved, a telephone interview to expedite allowance and issue would be welcomed.

Respectfully submitted,

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